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(54) **Receiver-Drier**

Sammler-Trockner

Accumulateur sécheur

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- **PATENT ABSTRACTS OF JAPAN vol. 2000, no. 09, 13 October 2000 (2000-10-13) & JP 2000 171127 A (FUJI KOKI CORP), 23 June 2000 (2000-06-23)**
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EP 1 193 455 B1

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Description

[0001] The present invention relates to a receiver-drier for storing the refrigerant used in an air conditioning device of a vehicle and the like.

[0002] Document U.S.-A-5,580,451, which represents the closest prior art, discloses an automotive type air conditioning refrigerant fluid drier assembly according to the preamble of claim 1. Said assembly is composed of a receiver tank and desiccant cup assembly. The receiver tank is formed to have a unitary construction. The desiccant cup is provided with a number of axially-spaced nib segments disposed adjacent its open end that forms detents and a cap that is received in the open end of the cup such that a peripheral edge of the cap engages at least some of the nib segments so as to secure a cap to the cup.

[0003] Moreover, documents U.S.-A-5,575,833 discloses a refrigerant recycling system comprising a drier/separator in which lubricant is separated from refrigerant vapor. After the lubricant is removed, the refrigerant vapor is filtered as it passes through a screen, a bed of molecular sieve material, and a fibrous pad. After passing through the first drier/separator, the refrigerant enters the compressor in which clean lubricant material is introduced to enable the compressor to operate effectively.

[0004] The air conditioning device mounted on a vehicle and the like is equipped with a receiver-drier that stores the refrigerant compressed by a compressor and liquidized by a condenser, and removes the moisture within the refrigerant.

[0005] The receiver-drier is formed of a cylindrical body, a refrigerant entrance through which the refrigerant enters the body, and a refrigerant exit.

[0006] The entrance and the exit of the refrigerant are positioned in the opposite sides in the axial direction of the body, and a drying chamber filled with a drying agent is equipped between the entrance and the exit.

[0007] The receiver-drier body comprises a cylindrical shape with one end being opened, formed of aluminum alloy so as to reduce the weight of the member.

[0008] The aluminum alloy has advantageous plasticity and fluidity, so the cylindrical body and a pipe that penetrates through the center portion of the body can be formed together integrally by forging.

[0009] For example, Japanese Laid-Open Patent Publication No. 5-305381 discloses a method for forming a double walled cylinder having one closed end by forging an aluminum alloy material.

SUMMARY OF THE INVENTION

[0010] In order to form a receiver-drier having as its body a double wall cylinder formed according to the above-mentioned prior-art method, it is necessary to cover the open end with a lid member, and to fix a pipe and the like to the opening portion that communicates to the entrance and the exit of the refrigerant.

[0011] The lid member is made of the same aluminum alloy material as the body, and the lid is fixed to the body by MIG welding means and the like.

[0012] The pipe, the plug and the like that are connected to the body are made of copper alloy material, so these members are joined to the body using for example a mechanical bonding means or a brazing means.

[0013] The present invention provides a receiver-drier applying an improved bonding means for fixing the pipe etc. onto the body.

[0014] The receiver-drier according to the present invention comprises as basic means a double wall cylinder body with a bottom and having a pipe member mounted to the center portion thereof, a pair of cap members penetrated by the pipe member and positioned inside said body, a drying agent filled to the space between the pair of cap members, and a lid member that covers the opening portion of said body. The present receiver-drier further comprises a body made of aluminum alloy which is forged integrally with a bottom member including a hole that communicates to said pipe member, a pipe inserted to the hole formed to the bottom member of the body and joined thereto by in-furnace brazing, and a coil spring positioned between the lid member and one of the cap members.

[0015] According to another aspect of the invention, the receiver-drier can be equipped with a body made of aluminum alloy which is forged integrally with a bottom member including a hole that communicates to the pipe member, a pipe inserted to a first hole formed to the bottom member of the body and bonded thereto by in-furnace brazing, a plug screwed onto a second hole either formed to the bottom member of the body or to the body, and a coil spring mounted between the lid member and one of the cap members.

[0016] The present receiver-drier can also include a body made of aluminum alloy which is forged integrally with a bottom member including a hole that communicates to the pipe member, a head having both a protrusion inserted to the hole formed to the bottom member of the body and a hole to which a protrusion formed to the bottom member of the body is inserted, and a bolt for fixing the head to the bottom portion of the body.

[0017] According to another aspect of the invention, the present receiver-drier further comprises a groove formed by knurling or punching the outside of said body, the groove protruding inwardly to the body so as to position the cap member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

FIG. 1 is a cross-sectional view showing a receiver-drier;

FIG. 2 is a plan view of FIG. 1;

FIG. 3 is a cross-sectional view showing the first embodiment of the present invention;
FIG. 4 is a plan view of FIG. 3;
FIG. 5 is a cross-sectional view showing an alternative embodiment of the present invention;
FIG. 6 is a cross-sectional view showing the second embodiment of the present invention;
FIG. 7 is a plan view of FIG. 6; and
FIG. 8 is a cross-sectional view showing an embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0019] FIG. 1 is a cross-sectional view showing the first embodiment of the present invention, and FIG. 2 is a plan view thereof.

[0020] The receiver-drier shown as a whole by reference number 100 comprises a body 110 formed by creating a cylindrical body with a bottom by forging an aluminum alloy material. The bottom member 120 of the body 110 is equipped with a first passage hole 122 and a second passage hole 124 for the refrigerant. One of the two passage holes for the refrigerant becomes the entrance hole of the refrigerant, and the other becomes the exit hole.

[0021] Pipes 140 and 142 made of copper alloy are respectively inserted to the two holes 122 and 124, and bonded thereto by in-furnace brazing.

[0022] A lid member 150 made of aluminum alloy is fit to the other end of the body 110 opposite the bottom member 120, which is fixed to position by TIG welding W_1.

[0023] A pipe member 130 formed to the center portion of the body 110 is integrally formed when forging the body 110.

[0024] A pair of cap members 160 and 170 penetrated by the pipe member 130 are positioned opposing one another in the body. The inner side of the cap members 160 and 170 are equipped with metallic mesh members 162 and 172, respectively, and the space defined by the body and the cap members is filled with a drying agent 180.

[0025] A groove 112 protruding inwardly is formed on the outer periphery of the body 110 by a knurling process or a punching process. The groove 112 creates a protrusion 112a that protrudes inwardly to the body, which is used for positioning the first cap member 160 in the axial direction that is positioned at a determined distance from the lid member 150.

[0026] A coil spring 155 is inserted between the lid member 150 and the second cap member 170, constantly pressing the second cap member 170 toward the first cap member 160. According to this structure, the density of the drying agent 180 is maintained uniformly, and the moisture within the refrigerant can be absorbed and removed effectively.

[0027] In a receiver-drier where the first pipe 140 is used as the entrance of the refrigerant, the refrigerant entering the body travels through the pipe member 130 formed integrally to the center of the body 110, and exits through the open end 132 into the space formed between the lid member 150 and the second cap member 170. The refrigerant passes through the second cap member 170 having gaps and the mesh member 172 into the drying agent 180, by which the moisture of the refrigerant is removed.

[0028] Thereafter, the refrigerant passes through the mesh member 162 and the first cap member 160 having gaps and is stored in the space formed between the first cap member 160 and the bottom member 120 of the body 110, before being sent out to other members of the air conditioning device through the second pipe 142.

[0029] When manufacturing the receiver-drier, the body 110 having two holes 122 and 124 formed to the bottom member 120 thereof and including a pipe member 130 integrally formed thereto is manufactured by forging, to which are assembled cap members 160, 170 and mesh members 162, 172. Then, the drying agent 180 is filled in the determined space, and the coil spring 155 is inserted thereto before fitting the lid member 150 to the body, which is welded by TIG welding W_1.

[0030] Next, pipes 140 and 142 are inserted to the assembled body, to which are performed in-furnace brazing so as to bond the pipes 140 and 142 to the holes 122 and 124 formed to the bottom member 120 of the body 110.

[0031] According to the method disclosed above, the receiver-drier is manufactured by a less number of manufacturing steps.

[0032] Moreover, as for the in-furnace brazing, the whole body is heated up to approximately 600 °C within the furnace, but the heat resistance of the receiver-drier can be secured by using metallic material for forming the cap members and the mesh members.

[0033] FIG. 3 is a cross-sectional view showing the first embodiment of the present invention, and FIG. 4 is a plan view thereof.

[0034] The receiver-drier shown as a whole by reference number 200 comprises a body 210 formed by brazing an aluminum alloy material into a cylindrical shape with a bottom. A first passage hole 222 and a second passage hole 224 are formed to the bottom member 220 of the body 210. One of the two passage holes for the refrigerant is used as the entrance hole of the refrigerant, and the other is used as the exit hole.

[0035] A pipe 240 and a plug 242 made of copper alloy are respectively inserted to the holes 222 and 224, and the pipe 240 and the plug 242 are welded to position by in-furnace brazing.

[0036] A lid member 250 made of aluminum alloy is fit to the opening of the body 210 opposite the bottom member 220, which is fixed to position by TIG welding W_1.

[0037] The pipe member 230 formed to the center area of the body 210 is formed integrally with the body

when forging the body 210.

[0038] A pair of cap members 260 and 270 penetrated by the pipe member 230 is positioned so as to oppose to one another inside the body 210. Metallic mesh members 262 and 272 are respectively positioned inside the cap members 260 and 270, and the space formed by these members within the body is filled with a drying agent 280.

[0039] A groove 212 protruding inwardly is formed on the outer periphery of the body 210 by a knurling process or a punching process. The groove 212 creates a protrusion 212a that protrudes inwardly to the body, which is used for positioning the first cap member 260 in the axial direction that is positioned at a determined distance from the lid member 250.

[0040] A coil spring 255 is inserted between the lid member 250 and the second cap member 270, constantly pressing the second cap member 270 toward the first cap member 260. According to this structure, the density of the drying agent 280 is maintained uniformly, and the moisture within the refrigerant can be absorbed and removed effectively.

[0041] The refrigerant entering the body travels through the pipe member 230 formed integrally to the center of the body 210, and exits through the open end 232 into the space formed between the lid member 250 and the second cap member 270. The refrigerant passes through the second cap member 270 having gaps and the mesh member 272 into the drying agent 280, by which the moisture in the refrigerant is removed.

[0042] Thereafter, the refrigerant passes through the mesh member 262 and the first cap member 260 having gaps and is stored in the space between the first cap member 260 and the bottom member 220 of the body 210, before being sent out to other members of the air conditioning device through the hole 224 formed to the bottom member 220 of the body and through the hole 244 of the plug 242.

[0043] When manufacturing the receiver-drier, the body 210 having a hole 222 utilized as the first passage hole of the refrigerant formed to the bottom member 220 thereof and including a pipe member 230 integrally formed thereto is manufactured by forging, and thereafter, a side hole 224 utilized as the second passage hole of the refrigerant is formed by after-processing as the second hole. Then, the cap members 260, 270 and mesh members 262, 272 are assembled to the body, the drying agent 280 is filled into the determined space, and the coil spring 255 is inserted in position before fitting the lid member 250 to the body, which is fixed by TIG welding W_1.

[0044] Next, the pipe 240 and the plug 242 are inserted to the hole 222 and the hole 224 formed to the bottom member 220 of the assembled body, and the pipe 240 and the plug 242 is respectively fixed to the hole 222 and hole 224 on the bottom member 220 of the body 210 by in-furnace brazing.

[0045] According to the method disclosed above, the receiver-drier is manufactured by a less number of manufacturing steps.

[0046] Moreover, as for the in-furnace brazing, the whole body is heated up to approximately 600 °C within the furnace, but the heat resistance of the receiver-drier can be secured by using metallic material to form the cap members and the mesh members.

[0047] According further to the present invention, the position of the second hole formed as a side hole 224 in the embodiment of FIG. 3 is not limited to the bottom member 220, but the second hole or side hole 224 can be formed on the body 210 close to the bottom member 220 by after-processing, as shown in the third embodiment of FIG. **5**. The plug 242 is inserted to the side hole 224 and fixed thereto by in-furnace brazing.

[0048] FIG. 6 is a cross-sectional view showing the second embodiment of the present invention, and FIG. 7 is a plan view thereof.

[0049] The receiver-drier shown as a whole by reference number 300 comprises a body 310 formed by forging an aluminum alloy material into a cylinder-shaped body with a bottom. The bottom member 320 of the body 310 is equipped with a first refrigerant passage hole 322 formed roughly to the center of the bottom member 320, and a second passage hole 324 formed to a protrusion 326 equipped to the bottom member 320. One of the two passage holes for the refrigerant becomes the entrance for the refrigerant, and the other passage becomes the exit of the refrigerant.

[0050] A corresponding member of a head 340 is inserted to the two holes 322 and 324 and bonded thereto.

[0051] A lid member 350 made of aluminum alloy is fit to the other end of the body 310 opposite the bottom portion 320, which is fixed to position by TIG welding W_1.

[0052] A pipe member 330 formed to the center portion of the body 310 is integrally formed when forging the body 310.

[0053] A pair of cap members 360 and 370 penetrated by the pipe member 330 are positioned so as to oppose to one another in the body. The inner side of the cap members 360 and 370 are equipped with sponge-like filter members 362 and 372, respectively, and the space defined by the body and the cap members is filled with a drying agent 380.

[0054] A groove 312 protruding inwardly is formed on the outer periphery of the body 310 by a knurling process or a punching process. The groove 312 creates a protrusion 312a that protrudes inwardly to the body, which is used for positioning the first cap member 360 in the axial direction that is positioned at a determined distance from the lid member 350.

[0055] The second cap member 370 is also positioned by a groove 314 formed similarly by a knurling process or a punching process . By the elasticity of the sponge-like filter members 362 and 372, the density of the drying agent 380 is maintained uniformly, and the moisture within the refrigerant can be absorbed and removed effectively.

[0056] The head 340 comprises a protrusion 342 that fits into the first hole 322. Similarly, the bottom member 320 of the body 310 comprises a protrusion 326 formed integrally with the body 310 and fits to the hole 344 of the head 340.

[0057] Seal members 343 and 327 are fit respectively to each protrusion 342 and 326, and then the protrusions are respectively inserted to the corresponding holes 322 and 344. A bolt 345 is used to secure the head 340 to the body 310.

[0058] The refrigerant entering the body through the first hole 322 travels through the pipe member 330 formed integrally to the center of the body 310, and exits through the open end 332 into the space formed between the lid member 350 and the second cap member 370. The refrigerant passes through the second cap member 370 having gaps and the filter member 372 into the drying agent 380, by which the moisture in the refrigerant is removed.

[0059] Thereafter, the refrigerant passes through the filter member 362 and the first cap member 360 having gaps and is stored in the space between the first cap member 360 and the bottom member 320 of the body 310, before being sent out to other members of the air conditioning device through the second hole 324.

[0060] When manufacturing the receiver-drier, the body 310 having the hole 322 and the protrusion 326 including the hole 324 formed to the bottom member 320 thereof and including the pipe member 330 integrally formed thereto is manufactured by forging. Then, cap members 360, 370 and filter members 362, 372 are assembled to the body, the drying agent 180 is filled to the determined space, and the lid member 150 is fit to the body, which is fixed by TIG welding W_1.

[0061] Next, a head 340 is fit to the assembled body, which is fixed by a bolt 345.

[0062] According to the manufacturing method explained above, the receiver-drier can be manufactured by a smaller number of steps.

[0063] According to the embodiment shown in FIG. 6, the first passage hole 322 is formed to the substantial center of the bottom member 320 of the body, and the second passage hole 324 is formed to the protrusion 326 equipped to the bottom member 320 of the body. However, it should be noted that the position to which the protrusion 326 is equipped could be varied from the embodiment shown in FIG. 6. That is, as explained in the fifth embodiment shown in FIG. 8, the protrusion 326 formed to fit into the hole 344 of the plug 340 is integrally formed to the body 310 at the substantial center of the bottom member 320, and the first passage hole 322 is formed to the protrusion 326. Further, the second passage hole 324 to which a protrusion 342 formed to the plug 340 is inserted is formed to the bottom member 320 of the body.

[0064] As explained above, the receiver-drier according to the present invention integrally forms a double wall cylinder body by forging an aluminum alloy material, which assembles necessary members in its structure. Therefore, the present receiver drier can be manufactured by a smaller number of processes or assembly steps.

[0065] Further, since the pipe or plug member made of copper alloy is joined to the body by in-furnace brazing, the required strength of the body can be secured by a simple structure.

Claims

1. A receiver-drier (200) comprising a double wall cylinder body (210) with a bottom and having a pipe member (230) mounted to the center area thereof, a pair of cap members (260,270) penetrated by the pipe member (230) and positioned inside said body (210), a drying agent (280) filled to the space formed between said pair of cap members (260,270), and a lid member (250) that covers the opening portion of said body (210):

   wherein said receiver-drier (200) comprises a body (210) made of aluminum alloy which is forged integrally with a bottom member (220) including a hole that communicates to said pipe member (230);

   a pipe (240) being inserted in a first hole (222) formed in the bottom member (220) of the body (210) for refrigerant entry;

   characterized in that a coil spring (255) is mounted between said lid member (250) and one of said cap members (270);

   and a plug (242) with a hole (244) is screwed into a second hole (224) formed in the bottom member (220) of the body (210) for the exit of dried refrigerant;

   said pipe (240) and said plug (242) being welded in their respective positions by in-furnace brazing.

2. A receiver-drier (300) comprising a double wall cylinder body (310) with a bottom and having a pipe member (330) mounted to the center area thereof, a pair of cap members (360.370) penetrated by the pipe member (330) and positioned inside said body (310), a drying agent (380) filled to the space formed between said pair of cap members (360,370), and a lid member (350) that covers the opening portion of said body (310);

   wherein said body (310) is made of aluminum alloy which is forged integrally with a bottom member (320) including a hole that communicates with said pipe member (330);

   characterized in that said receiver-drier (300) comprises a head (340) having a protrusion (342) with a hole, said protrusion (342) being inserted in the hole (322) formed in the bottom member (320) of the body (310) and a protrusion (326) in the bottom member with a hole (324), said hole (324)

corresponding with a second hole (344) in said head (340);

a bolt (345) for fixing said head (340) to the bottom portion (320) of the body (310).

3. A receiver-drier (300) according to claims 1 or 2, wherein said receiver-drier (300) comprises a groove (314) formed by knurling or punching the outside of said body (310), said groove (314) protruding inwardly of the body (310) so as to position said cap member (370).

Patentansprüche

1. Sammler-Trockner (200), mit einem doppelwandigen Zylinderkörper (210) mit einem Boden, in dessen zentralem Bereich ein Rohrelement (230) befestig ist, einem Paar von Kappen-Elementen (260,270), die von dem Rohrelement (230) durchdrungen werden und innerhalb des Körpers (210) angeordnet sind, einem Trocknungsmittel (280), das in den Raum zwischen dem Paar von Kappen-Elementen (260,270) eingefüllt ist, und einem Dekkelelement (250), das den Öffnungsbereich des Körpers (210) verdeckt;

welcher Sammler-Trockner (200) einen Körper (210) aus einer Aluminiumlegierung umfaßt, der einstückig mit einem Bodenelement (220) geschmiedet ist, welches ein Loch aufweist, das mit dem Rohrelement (230) kommuniziert;

wobei ein Rohr (240) in ein erstes Loch (222) in dem Bodenelement (220) des Körpers (210) zum Einlaß eines Kältemittels eingesetzt ist;

dadurch gekennzeichnet, dass eine Schraubenfeder (255) zwischen dem Deckelelement (250) und einem der Kappenelemente (270) befestigt ist;

und dass ein Stopfen (242) mit einem Loch (244) in ein zweites Loch (224) in dem Bodenelement (220) des Körpers (210) zum Auslaß getrockneten Kältemittels eingeschraubt ist;

welches Rohr (240) und welcher Stopfen (242) in ihren jeweiligen Positionen durch Ofenhartlöten verschweißt sind.

2. Sammler-Trockner (300), mit einem doppelwandigen Zylinderkörper (310) mit einem Boden, in dessen zentralem Bereich ein Rohrelement (330) befestigt ist, einem Paar von Kappen-Elementen (360,370), die von dem Rohrelement (330) durchdrungen werden und innerhalb des Körpers (310) angeordnet sind, einem Trocknungsmittel (380), das in den Raum zwischen dem Paar von Kappen-Elementen (360,370) eingefüllt ist, und einem Dekkelelement (350), das den Öffnungsbereich des Körpers (310) abdeckt;

welcher Körper (310) aus einer Aluminiumlegierung besteht, die einstückig mit einem Bodenelement (320) geschmiedet ist, welches ein Loch aufweist, das mit dem Rohrelement (330) kommuniziert;

dadurch gekennzeichnet , dass der Sammler-Trockner (300) einen Kopf (340) mit einem Vorsprung (342) mit einem Loch umfaßt, welcher Vorsprung (342) in das Loch (322) in dem Bodenelement (320) des Körpers (310) eingesetzt ist, sowie einen Vorsprung (326) in dem Bodenelement mit einem Loch (324), welches Loch (324) einem zweiten Loch (344) in dem Kopf (340) entspricht;

und einem Bolzen (345) zur Befestigung des Kopfes (340) an dem Bodenbereich (320) des Körpers (310).

3. Sammler-Trockner (300) gemäß Anspruch 1 oder 2, welcher Sammler-Trockner (300) eine Nut (314) umfaßt, die gebildet wird durch Rändeln oder Pressen des Außenbereichs des Körpers (310), welche Nut (314) zum Inneren des Körpers (310) auf solche Weise vorspringt, dass sie das Kappenelement (370) positioniert.

Revendications

1. Accumulateur - sécheur (200) comprenant un corps de cylindre à double parol (210) avec un fond et doté d'un élément de tube (230) monté sur sa zone centrale, une paire d'éléments formant capuchons (260, 270) pénétrés par l'élément de tube (230) et positionnés à l'intérieur dudit corps (210), un agent séchant (280) remplissant l'espace formé entre ladite paire d'éléments formant capuchons (260, 270) et un élément formant couvercle (250) qui recouvre la partie d'ouverture dudit corps (210) ;

dans lequel ledit accumulateur - sécheur (200) comprend un corps (210) réalisé à partir d'un alliage d'aluminium qui est forgé d'un seul tenant avec un élément inférieur (220) comprenant un trou qui communique avec ledit élément de tube (230) ;

un tube (240) étant inséré dans un premier trou (222) formé dans l'élément inférieur (220) du corps (210) pour l'entrée du réfrigérant ;

caractérisé en ce qu'un ressort hélicoïdal (255) est monté entre ledit élément formant couvercle (250) et l'un desdits éléments formant capuchons (270) ;

et un bouchon (242) avec un trou (244) est vissé dans un second trou (224) formé dans l'élément inférieur (220) du corps (210) pour la sortie du réfrigérant séché ;

ledit tube (240) et ledit bouchon (242) étant soudés dans leurs positions respectives par brasage au four.

2. Accumulateur - sécheur (300) comprenant un corps

de cylindre à double paroi (310) avec un fond et doté d'un élément de tube (330) monté sur sa zone centrale, une paire d'éléments formant capuchons (360, 370) pénétrés par l'élément de tube (330) et positionnés à l'intérieur dudit corps (310), un agent séchant (380) remplissant l'espace formé entre ladite paire d'éléments formant capuchons (360, 370) et un élément formant couvercle (350) qui recouvre la partie d'ouverture dudit corps (310) ;

dans lequel ledit corps (310) est réalisé à partir d'un alliage d'aluminium qui est forgé d'un seul tenant avec un élément inférieur (320) comprenant un trou qui communique avec ledit élément de tube (330) ;

caractérisé en ce que ledit accumulateur - sécheur (300) comprend une tête (340) dotée d'une saillie (342) avec un trou, ladite saillie (342) étant insérée dans le trou (322) formé dans l'élément inférieur (320) du corps et une saillie (326) dans l'élément inférieur avec un trou (324), ledit trou (324) correspondant avec un second trou (344) dans ladite tête (340) ; et

un boulon (345) pour fixer ladite tête (340) sur la partie inférieure (320) du corps (310).

3. Accumulateur - sécheur (300) selon les revendications 1 ou 2, dans lequel ledit accumulateur - sécheur (300) comprend une rainure (314) formée en moletant ou en poinçonnant l'extérieur dudit corps (310), ladite rainure (314) faisant saillie vers l'intérieur du corps (310) afin de positionner ledit élément formant capuchon (370).

Fig. 1

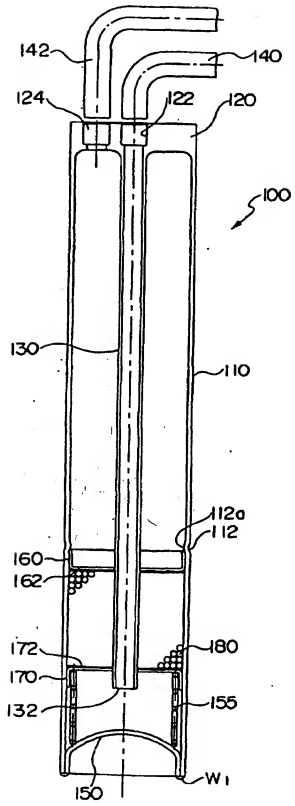
142
140
124
122
120
100
130
110
112a
112
160
162
172
180
170
132
155
150
W1

Fig. 2

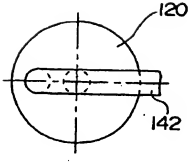

Fig. 3

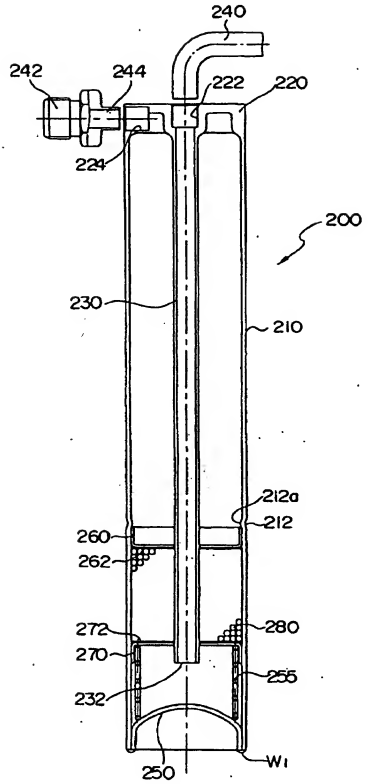
240
242
244
222
220
224
200
230
210
212a
212
260
262
272
280
270
255
232
250
W1

Fig. 4

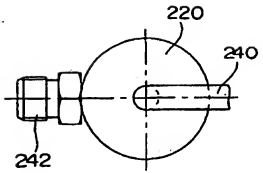

Fig. 5

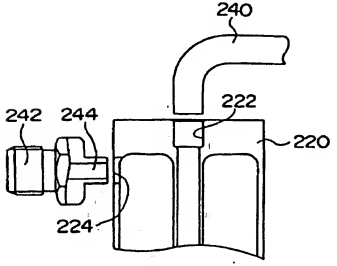

Fig. 6

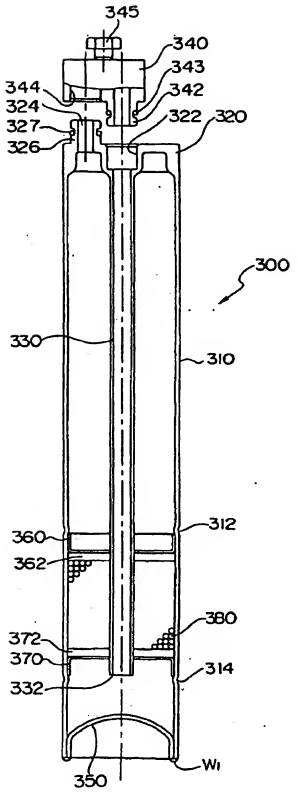
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Fig. 7

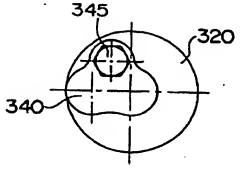

Fig. 8